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A Study of the
**ECONOMICS OF
LAND USE AND
LIVESTOCK PRODUCTION**
in
GREECE

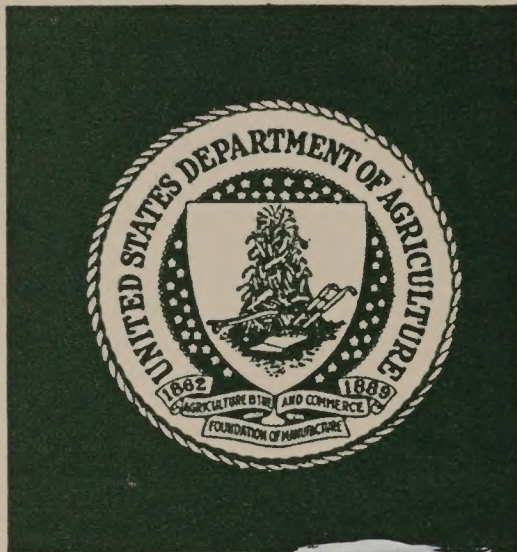
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**A STUDY OF THE
ECONOMICS OF LAND USE
AND LIVESTOCK PRODUCTION
IN GREECE**

by

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International Agricultural Development Service
Foreign Agricultural Service

UNITED STATES DEPARTMENT OF AGRICULTURE / JUNE 1967

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SUMMARY

From a technological point of view, Greece has made tremendous progress in increasing its grain production. The results over the past 5 years have surpassed earlier expectations, and reflect primarily increased crop yields. These increased yields have grown out of the expanded application of improved techniques (new higher yielding varieties, wider use of fertilizers and weed killers, and larger use of farm machinery), and provide evidence of the ability of the Greek farmer to adopt modern principles of agriculture whenever this may increase his income. The grain policy of the Greek Government has undoubtedly offered incentives to this effect.

Greece now has a grain surplus which must be exported at a considerable loss to its treasury. All signs point to further increases in grain yields. The combined wheat and barley harvest of 1966 exceeded domestic use by about 340,000 metric tons. The combined 1967 wheat and barley harvests will exceed domestic use by not less than 450,000 metric tons, according to present estimates of the Ministry of Agriculture.

Thus, the basic original objective of the present grain subsidy--to raise grain production--no longer exists. Its sole purpose is to add to farm incomes. Growing budget losses should make the Greek Government aware of the necessity of adjusting its grain subsidy program so as to change the Nation's present pattern of land use in connection with crop production to one that will be more suitable in the future. This adjustment would be made under the fundamental presumption that such a pattern should place Greece in an advantageous position in view of aligning her agricultural policy to that of the EEC.

It is apparent that with some shifts in land use from wheat to corn and the higher yielding forages, Greece can produce enough feed to meet substantially her animal feed requirements. In the short run, however, it is felt that some immediate action should be taken to discontinue the further expansion of barley surpluses, since the launching of any livestock development program will require some time before the amount of presently produced barley may be fully utilized.

Thus, the basic agricultural production problem in Greece today is to raise the general level of technology in livestock and dairy production. The present structure of distribution of livestock population in Greece, where many farmers have a very small number of animals, does not lend itself to the adoption of improved livestock technology. There is no improved level of livestock technology in Greece, ready to be widely adopted by Greek farmers, as was the case when the Government price incentives were made available for wheat and barley. Therefore, increasing subsidies on livestock prices now very likely would not produce the same type of production response as when the grain subsidies were installed.

There is evidence that under present feed-livestock price relationships, livestock production is profitable when the methods and management in common use in the United States are employed, and provided that marketing practices will create incentives to produce a better quality of livestock products in general. Also, there is a need for certain changes in the Government's retail price regulations on meat and dairy products, and for a modernization of the present marketing system for these products. Major consideration should be given to the fact that Greek farmers must be protected against sudden floods of imports which temporarily demoralize prices.

The establishment of enterprises governed entirely by economic criteria and operated with the same methods and management as in the United States would be the best way to introduce modern technology in livestock production and to give all of those involved the opportunity to appraise the advantages of such a plan. The facilities, the kind of livestock, the rations fed to livestock, and the management should be of the type that would make it obvious to everyone what could happen if Greek farmers were to apply modern technology on their own farms.

Greece also will need some additional livestock. We are told that some light cattle are available to be imported from Yugoslavia and possibly Ireland for feeding to heavier weights. Since the cost of transporting animals from the United States is high, the search for low-cost methods of transporting Holstein bull calves should be continued. The Greek Government

might like to consider the remodeling of a Greek flagship for this purpose. This will result in saving a considerable amount of foreign exchange. The best source of Holstein dairy heifers is the United States. The present source of Merino rams for crossbreeding with sheep to obtain more meat and wool is Hungary.

A program to improve the level of technology in livestock production is not easy to initiate. Nor is it one man's operation. It requires the combined efforts of various sectors of the economy and undoubtedly demands teamwork. Initiation of such a program requires a thorough consideration of administrative procedures which will help the planning and implementation of a program which would revolutionize the traditional pattern of Greek agriculture. Perhaps the establishment of a livestock development corporation vested with full authority to carry out such a program may be a better tool in the hands of the Greek Government.

If such a proposal does not meet with the approval of the Greek Government, some other alternative should be worked out as soon as possible.

It is not a matter of whether Greece can afford to mobilize herself to meet this problem. She cannot afford to do otherwise.

A STUDY OF THE ECONOMICS OF LAND USE AND LIVESTOCK PRODUCTION IN GREECE

March-June 1967

by the

U.S. Department of Agriculture

Introduction

Agriculture is the most important segment of the Greek economy. It employs about half of the nation's population, and it contributes about a fourth of the nation's gross national product.

In Greece, agricultural development is impeded because of: (a) small farm holdings, which in general are further fragmented into a large number of small plots; (b) a low level of technology, especially in livestock production; and (c) inadequate marketing of agricultural products. Agricultural output and income per person is therefore low.

Food imports into Greece have risen sharply in recent years, as income of consumers increased and demands for tourist trade expanded. As a result, Greece had to spend over 75 percent more foreign exchange for foodstuffs in 1965 than in 1961.

Imports of all meats except goat and pork have risen sharply. In 1965 and in 1966, imports of meat and live animals totaled about \$73 million, about 125 percent more than the total in 1961.

Imports of milk and dairy products also have risen, although not as sharply as imports of meat. In 1965, they totaled about \$24 million, or nearly 50 percent more than they totaled in 1961.

In 1965, imports of livestock and meat, and dairy products totaled about \$96 million, which was about 55 percent of the total amount of foodstuffs (\$177 million) imported that year. Preliminary estimates indicated a further increase in these figures during 1966.

Yet, in the face of this deficit in livestock and dairy production, Greece is producing surplus grain. Wheat production has been in the neighborhood of 2 million tons for the last 3 years. Barley output has risen. Wheat and barley exports from last year's harvests are expected to reach 245,000 metric tons.

Even higher yields from both crops are expected over the next few years. This raises certain questions pertaining to agricultural policy:

- (1) What land use cropping pattern is best for Greece? This calls for a cost and return analysis of alternative cropping patterns, given the domestic and world market outlook.
- (2) Would it be better for Greece to utilize the grain now being exported in its livestock production?

Table 1. Selected Foreign Exchange Transactions
Relating to Agriculture, 1961, 1963, and 1965

	<u>1961</u>	<u>1963</u>	<u>1965</u>	<u>1966</u>
	-----	<u>Million Dollars</u>	-----	-----
<u>Imports</u>				
Foodstuffs:				
Meat and Live Animals	32.4	38.1	72.6	73.1
Milk and Milk Products	16.0	12.4	23.8	21.1
Wheat and Cereals (including flour)	16.1	19.3	25.4	27.9
All other	35.5	62.1	54.9	58.8
Total Foodstuffs	100.0	131.9	176.7	180.9
Raw Materials:				
Raw Hides	4.4	5.4	6.1	7.6
Wool	14.8	17.8	18.0	21.1

LAND USE CAPABILITY

Greece is increasing rapidly its capability to produce grain. Improved technology (use of higher yielding varieties, increased and better use of fertilizer, pesticides, and weed killers, better cultural practices) and an assured governmental market purchase program at an attractive price are responsible.

In just 2 years, from 1964 to 1966, the yield per stremma of oats has risen 12 percent; corn, 23 percent; and barley, 33 percent. Wheat yields per stremma rose only 8 percent from 1964 to 1966. Feedgrain yields in 1966 reached the level expected in 1970, according to the Five-Year Economic Development Plan, and wheat almost reached it. The big increase in wheat yields came in the early 1960's.

Total wheat output rose from 1,693,000 metric tons in 1960 to an estimated 1,962,000 metric tons in 1966, an increase of nearly 16 percent. Table 2 shows that the increase in feedgrain production was even greater. A common measurement for all feedgrains is the total digestable nutrients. TDN increased from slightly more than 500,000 metric tons in 1960 and 1961 to 869,000 metric tons in 1966, an increase of over 70 percent.

At present, net returns to the producer from the winter crops of barley and wheat appear to be about the same in the plains area. The yield of barley is slightly higher per stremma in the mountains and semimountainous area than that of wheat; thus, the net return is slightly higher. The costs of production for the two crops are about the same.

In 1962, two-thirds of the wheat and nearly three-fourths of the barley was produced on the plains. About 12 percent of the wheat and 9 percent of the barley is produced in the mountains. Costs of production, including labor, per stremma in the mountains are over twice those in the plains. The reason for the big difference is the additional labor needed in the mountains. This means that the mountain farmer in effect gets a low return for his work because he has to do so much more of it for every kilogram of grain that he produces. Yet, as long as he stays there and farms, wheat and barley are the best paying outlets for his labor on his cropland.

Table 2. Grain Supplies and Meat Production, 1960-66

Item	1960	1961	1962	1963	1964	1965	1966
Grain Production <u>1/</u>							
	1,693	1,594	1,770	1,387	2,170	1,989	1,962
Wheat	232	235	252	243	278	412	632
Barley	281	270	266	312	289	279	323
Corn	194	153	155	136	155	177	174
Oats							
Feed Grain Supplies (TDN Basis)							
	507	503	515	532	554	665	869
Produced <u>2/</u>	99	101	110	193	227	227	315
Imported <u>3/</u>	606	604	625	725	781	892	1,184
Total TDN Available for Livestock							
Meat Supplies <u>4/</u>							
	159	169	186	200	217	229	245
Produced	37	51	47	63	61	96	100
Imported	196	220	233	263	278	325	345
Total Meat Supplies							
Conversion Coefficient <u>5/</u>	3.82	3.57	3.37	3.62	3.60	3.89	4.83

1/ 1960 and 1966 crop production from Greek Dept. of Agriculture, 1961 thru 1965 from Indices of Agri. Prod. for the Near East and South Asia, Dec. 1966, ERS, USDA, and 1970 is 1964 production increased by 70.4% as explained in 5 yr. plan Chapt. 14 page 16.

2/ Three grains production times respective TDN%. TDN, from Agricultural Attache reports and Ag Statistics, USDA.

3/ Imports of grain less exports if any, converted to TDN, from Ag Attache reports and Ag Statistics, USDA.

4/ From the Dept. of Agriculture in Greece, Dec. 1966, page 29; and the 5 yr Economic Plan Chapt. 14, page 22.

5/ Conversion coefficient represents the units of feed grains required to produce one of the same units of meat.

Lowering the support price will not cause the farmer to stop grain production as long as he stays there and cultivates land. But it can cause him to alternate the production of wheat and barley, since the costs of production for the two crops are almost the same. However, the yield in barley is expected to increase in proportion to the increase in the yield of wheat. So, in the mountainous areas, a shift to the use of land for producing barley can be expected in the next 5 to 10 years. But because habit and tradition are stronger in the mountainous areas, the tendency to shift probably will be less than that in the plains.

There has been a slight reduction in the total area of land planted to wheat. A total of about 11.4 million stremma was planted to wheat in 1966, about 1.2 million stremma under that planted to wheat in 1960. The area planted to feedgrains, on the other hand, has increased about 0.6 million stremma, or half the decrease in area planted to wheat. Apparently no data are available that differentiates the changes in land use between the mountainous areas and the plains.

The area planted to alfalfa increased by about 0.7 million stremma between 1960 and 1966. Alfalfa, at present prices, will return more profit than wheat or barley on irrigated land, but not on dry land. Alfalfa compares favorably with corn on irrigated land. But if the corn is double cropped with barley or wheat, the profit advantage appears to swing away from alfalfa.

The guaranteed Government purchase price for barley is Dr. 2.60 per kilogram. This is Dr. 0.5 higher than the Dr. 2.10 resale price to the livestock feeder. The guaranteed Government purchase price for wheat varies with the size of the farm production unit from which it is sold. In 1966, the guaranteed purchase price was estimated to average about Dr. 2.55 per kilogram. The Government wheat resale price to the millers is based on a formula which results in recovering most of the cost to the Government. The Dr. 2.10 per kilogram resale price to feeders is about Dr. 0.45 per kilogram below the purchase price.

The practical effect of these Government fixed price relationships on wheat and barley has been to give an income support to grain producers. In economic terms, it amounts to a transfer

of income from taxpayers to grain producers. Everybody that is farming seems to produce some grain, so virtually every farmer becomes eligible for some income support. In addition, when these prices were set, Greece needed to raise its grain production; thus, this income support had the added advantage of encouraging additional desired production.

Fortunately, some new production technology was introduced at about the same time. The planting of improved wheat varieties which would mature earlier, the use of fertilizer and weed killers, mechanization of farms, and the like, probably would have raised yields had there been no government guaranteed purchase program. But the increase in price and the knowledge of an assured price and market in particular were factors that contributed to the yield increase.

Now that the output of wheat and barley exceeds domestic consumption, the Greek Government has been forced to export the surplus at world prices, which are below the pegged domestic resale prices.

Surplus wheat was the first to be exported at world prices. As a result, the assured government price on soft wheat has been reduced. In 1964, the government base price was Dr. 3.00 per kg. In 1965, this was dropped to Dr. 2.60 and in 1966 and 1967 it has been Dr. 2.20.

About a fourth of the decline in the assured wheat purchase price has been offset by higher yields. However, the Government assured price for barley has not been reduced. In addition, the barley yield increased a third between 1964 and 1966. As a result, farmers were given an incentive to produce, and the trend shifted from the production of wheat to that of barley.

As long as these crops were used entirely within Greece, these Government pegged price relationships and the income transfer to farmers were matters of the Greek Government only. But once output became greater than domestic consumption, the practical result was a Greek subsidy on the production of grain which gave the advantage to the importing nation.

The combined wheat and barley crop of 1966 exceeded domestic consumption by about 340,000 metric tons. According to the estimates of the Greek Ministry of Agriculture, the combined 1967 crop will exceed domestic use by a minimum of 450,000 tons.

Greece is not rich enough to subsidize grain production for export. The May 1967 sale of 10,000 metric tons of barley to Germany was very ironic. In early 1967 Germany was one of the countries belonging to the European Common Market which were shipping broilers into Greece at prices below those Greek producers received for their own broilers.

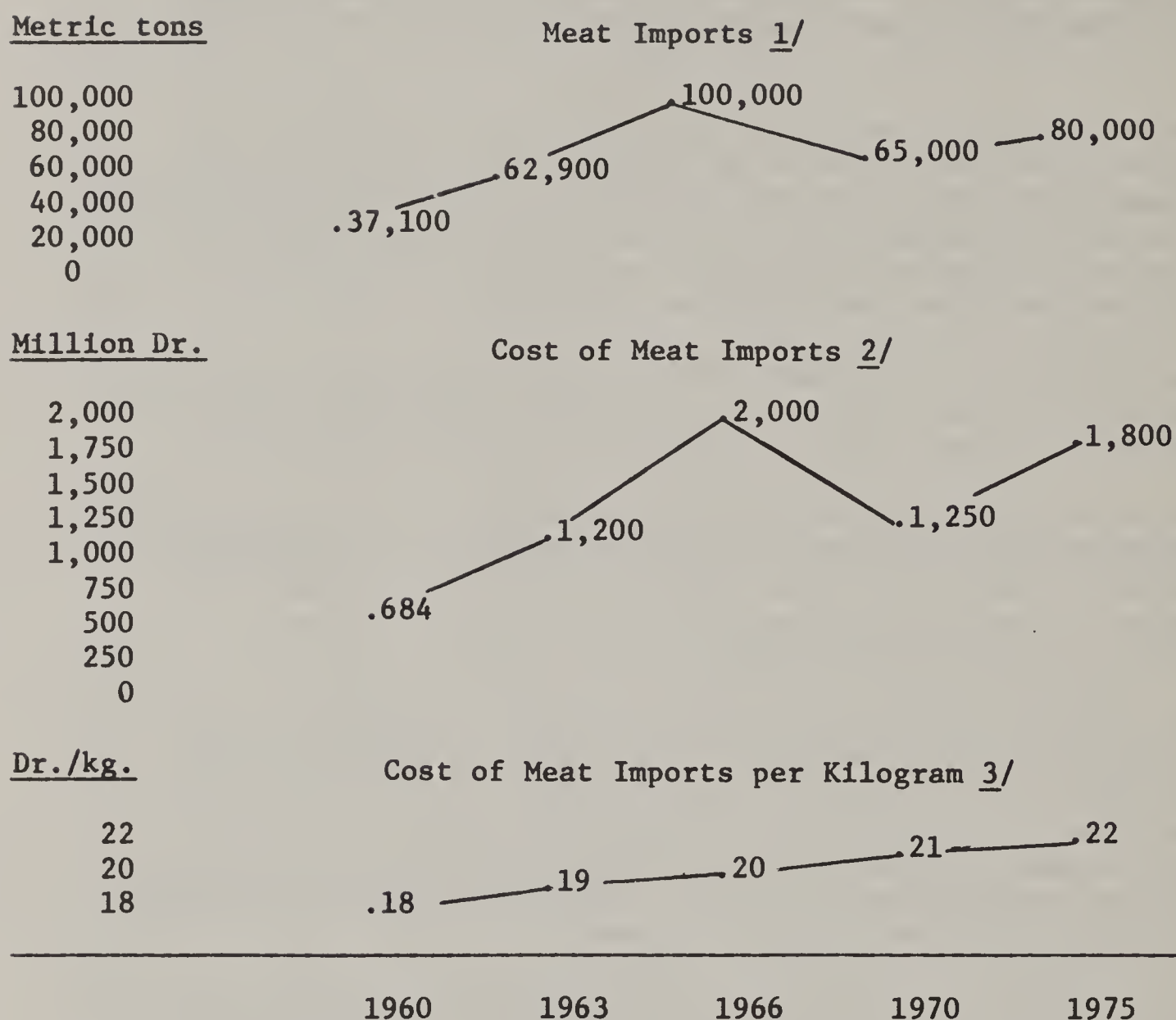
Thus, the Greek Government, in an effort to recover a part of the costs of the barley it had purchased, sold grain to a competitor cheaper than it charges its own broiler producers.

Meanwhile, the drain on its foreign exchange, as a result of having to import livestock and dairy products, has increased. Instead of importing large quantities of livestock and dairy products, Greece should take steps to increase its own production of these products.

The cost of meat imports has been rising. In 1960, the cost of imported meat averaged Dr. 18 per kg. In 1963, the cost had risen to Dr. 19 per kg. and by 1966 to Dr. 20. At the same time the tonnage imported in 1966 was over 2½ times the 1960 volume. If present trends continue, the price of imports will have reached Dr. 22 by 1975. And this assumes no significant rise in the world price of meat.

Table 3 shows the amount of feedgrain that Greece would need to produce to reduce the drain that importing livestock and dairy products is placing on its foreign exchange. The figures indicate that output of meat will be more than doubled by 1975. Table 4 indicates that such a feedgrain output is feasible and practical within the framework of present expected trends toward higher yields per stremma, if the proper shift in land use is made. These estimates of future yields were based on the estimates of Greek scientists and published reports, as well as historical trends. The area estimated to be planted to each crop was based mainly on past trends. For example, more corn was projected under

Figure A. Meat Imports and Costs, Selected Years



1/ From Table 2.

2/ From "Development of Agriculture in Greece" Dec. 1966, and estimates.

3/ Calculated from data above, rounded to nearest drachma.

Table 3. Projections of Meat Requirements and Feed Grain Needs to Meet Greek Meat Requirements in 1970, and 1975

Item	: 1966	: 1970	: 1975
	: Estimated	: Projected	: Projected
	Metric Tons		
Meat Production	: 245,000	395,000 <u>2/</u>	520,000 <u>2/</u>
Meat Imports	: 100,000	65,000 <u>2/</u>	80,000 <u>2/</u>
Meat Consumption <u>1/</u>	: 345,000	460,000	600,000
Feed Grain Needs (TDN Basis)	: 869,227	1,343,000 <u>2/</u>	1,716,000 <u>2/</u>

1/ Center for Planning and Economic Research.

2/ Projected by authors.

Table 4. Source of Feed Grains 1/ to Support Future
Meat Requirements 2/

Item	1966 Estimated	1970 Projected	1975 Projected
Barley:			
kg/str.	197	250	300
Stremma	3,207,841	3,540,000	3,800,000
Grain, Mil. Tons	631,945	885,000	1,140,000
TDN, Mil. Tons	492,917	690,300	889,200
Corn:			
Non-irrig., kg/str.	160	200	250
Stremma	740,210	1,200,000	1,300,000
Grain, Mil. Tons	118,434	240,000	325,000
TDN, Mil. Tons	94,747	192,000	260,000
Corn:			
Irrig. kg/str.	299	400	500
Stremma <u>3/</u>	682,766	900,000	1,000,000
Grain, Mil. Tons	204,147	360,000	500,000
TDN, Mil. Tons	163,318	288,000	400,000
Oats:			
kg/str.	143	175	200
Stremma	1,216,013	1,200,000	1,100,000
Grain, Mil. Tons	173,890	210,000	220,000
TDN, Mil. Tons	118,245	142,800	149,600
Wheat, feed:			
kg/str.	<u>4/</u>	<u>5/230</u>	<u>5/270</u>
Stremma	---	156,540	76,440
Grain, Mil. Tons	---	36,004	20,639
TDN, Mil. Tons	---	29,900	17,200
Stremma, Total:	5,846,830	6,996,540	7,276,440
TDN, Mil. Tons Total:	<u>6/869,227</u>	1,343,000	1,716,000
TDN, kg/str. <u>7/</u>	149	192	236

Footnotes on page 11.

- 1/ Distribution among or quantity supplied by each feed grain is based on historical data plus comments of professional technicians as guides to yields for 2 estimates in 1970 and 1 in 1975.
- 2/ Meat requirements from table 3.
- 3/ Irrigated corn assumed 1,750,000 stremma of additional irrigated land by 1970, (5 year plan, page 54) distributed about as in the past with one acre out of each 17 in corn.
- 4/ Quantity of wheat fed is not known, but it could readily equal the quantity of barley exported which was 60,000 metric tons.
- 5/ Quantities of wheat fed in the last 1970 estimate and 1975 estimate were the quantities needed to fill the estimate of feedgrains.
- 6/ This 869,227 metric tons is only the home production of feedgrains and does not include the 314,685 metric tons of imported feedgrains. The conversion coefficient shown for 1966 in table 2 was 4.83. But when feedgrain imports are included a new conversion coefficient of 3.55 is obtained which is in line with 1960-65 conversion coefficients shown in table 2. Thus, it appears enough feedgrain was available in Greece in 1966 to produce the estimated 245,000 metric tons of meat.
- 7/ The TDN production as measured in kg/str. is another indicator of production. In 1964 the TDN per stremma was 119 kilograms.

irrigation because more land is to be irrigated, but the total land area devoted to corn, as compared to other crops grown under irrigation, is assumed to remain about what it has been in recent years.

Unless additional land is planted to feedgrains, the trend increase in yields per stremma will not in itself be sufficient to result in the projected 1975 meat output. Compared with 1966, an additional 1.4 million stremma will need to be shifted to feedgrain production, especially the production of barley and corn. This additional stremma can be readily shifted from land now planted to wheat, as is shown in figure B. It is estimated that by 1970 about 8.5 million stremma, a decrease of 1.7 million stremma from 1966, will be needed for the planting of wheat to meet Greece's needs. By 1975 only about 7.0 million stremma, a further reduction of 1.5 million stremma, will be needed for this purpose.

What is more, this projection of land use indicates that by 1975 all wheat can be produced in the plains area; not any need be produced in the mountainous or semimountainous areas. None of the feedgrains would need to be produced in the mountainous or semimountainous areas, except where it is needed locally and is less costly to produce there than to purchase and transport from other areas.

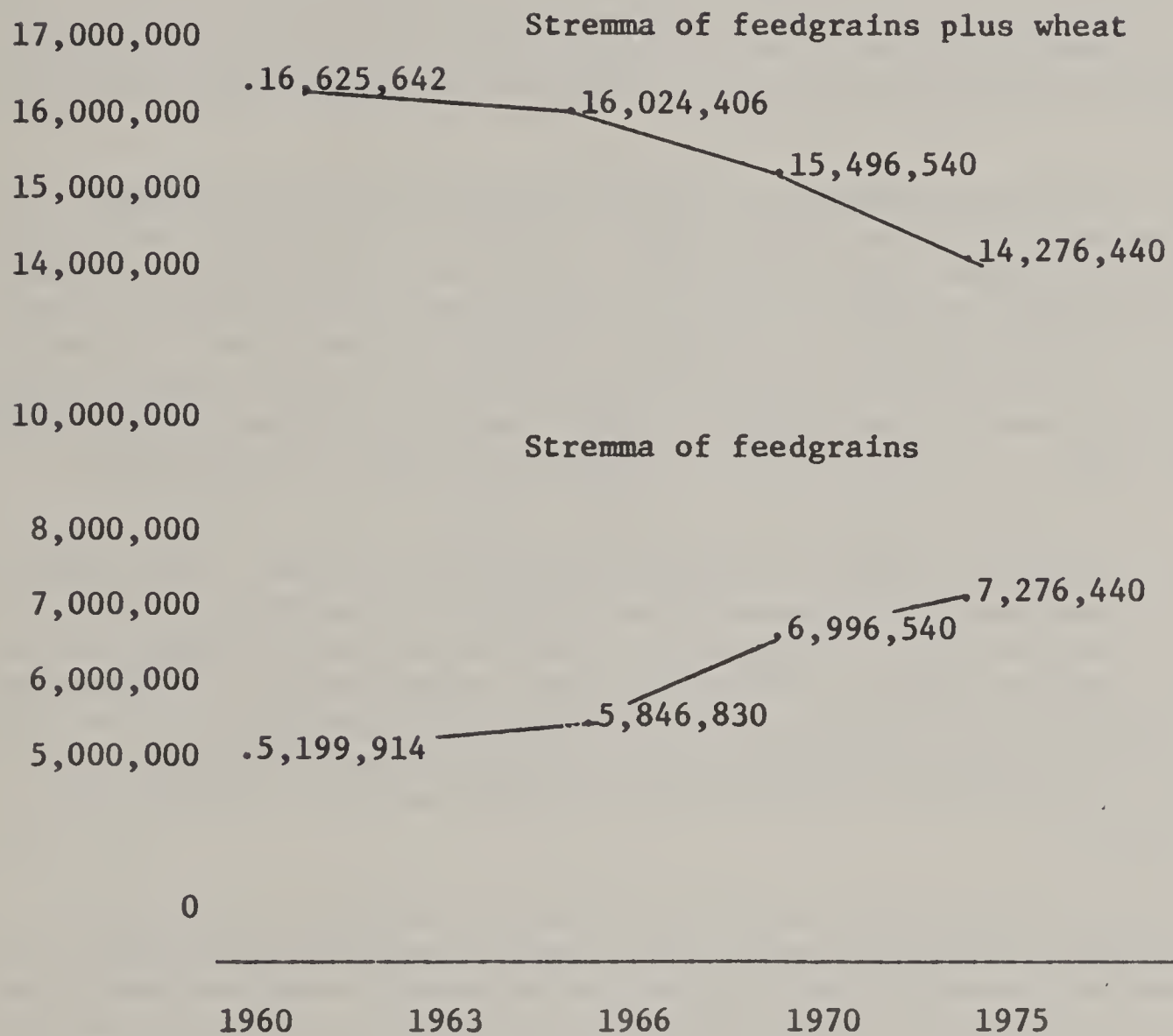
The additional land could be used for the increased production of alfalfa, corn silage, chopped green corn, and other forage.

This projection does not take into account the probability of double cropping, that is, a crop of barley or wheat in the winter followed by an irrigated summer crop of corn silage or chopped green corn. This practice is likely to develop in irrigated areas near livestock feeding areas.

Neither does the projection assume any gains from forage improvement practices. Dr. R. Merton Love of the University of California and Dr. Leonidas Liacos, Director of Forest Research Center for Macedonia and Thrace, and Associate Professor Range Management, University of Thessaloniki have been doing research in forage management in Macedonia and Thrace. Their studies show that Greece can triple its present grazing capacity by following recommended

Figure B: Land Use of Feedgrains and Wheat,
Selected Years 1/

Stremma of
Feedgrains
and Wheat



1/ From Ministry of Agriculture and table 4.

practices. They say that most ranges need only a little rest before they can be used again. Reseeding with annual legumes could triple pasture production and increase protein output six times if grazing is controlled.

Also, as horses and mules are replaced by tractors, the grain no longer needed by these animals will become available to feed other livestock. Horses and mules are currently declining in numbers at the rate of 2 percent, or 10,000 head, yearly.

It appears that it is possible for Greece to produce the feed and forage needed to meet the projected meat production requirements in 1970 and 1975.

The output per stremma of feedgrains has increased more than expected during the past 2 years. Present rate of increase is expected to continue until 1970. A slower rate of rise in output per stremma from 1970 to 1975, of only two-thirds the rate from 1964 to 1970, would still make a feedgrain total equal to that required to meet the projected meat output. However, some change in land use will be required. Some land now used to produce wheat will have to produce barley and corn and high-yielding forage crops such as alfalfa, corn silage, and green chopped corn.

The question of costs of producing more meat arises. To answer this question it is necessary to assume certain things. To determine farm production costs, scientists gathered information from various sources. These included, among others, the Ministry of Agriculture, Agricultural Economics and Planning Division; the Agricultural Bank of Greece, Economic Research Section; and the University of Thessaloniki, Department of Agricultural Economics.

Information from all sources was used in developing enterprise costs for different years. Considerable emphasis was given to costs of production in level or plains areas, where mechanization is most advanced, then to semimountainous areas, and last to mountainous areas that use more animal labor and, either because of terrain or size of field, frequently harvest cereal crops by hand.

Out of the above situation a cost of production figure per metric ton was developed for 1966 and projections made for 1970 and 1975, as shown in table 5. These costs of production per ton were multiplied by the tonnage produced for a crop, as shown in table 4, to obtain a total cost. The total costs range from Dr. 2.3 million in 1966 to Dr. 3.1 million in 1975.

Figure C shows the increase in meat production and the feedgrain costs estimated to produce that meat. Meat production increased from 1960 to 1975 by 320 percent, while costs during the same period increased by 170 percent. The lower rate of increase for costs results because yields per stremma increased sufficiently to help reduce the cost per unit of output.

The feedgrain cost per kilogram of meat produced appears at the bottom of figure C. This cost declined from Dr. 12 in 1960 to Dr. 9 in 1966, and to Dr. 6 in 1975. This drop in cost per kilogram is in definite contrast to the increased meat import cost per kilogram shown in figure A. A comparison of the two cost situations makes it very evident that meat production should be encouraged as an economic step toward the development of the economy.

The Government's grain purchase program was inaugurated to encourage the production of grain needed for domestic use. But the cereal crops in 1966 exceeded domestic requirements. It is estimated that 285,000 metric tons of the 1966 wheat crop and about 35,000 metric tons of the barley crop will be exported. The difference between the FOB export grain price and the price paid the producers on these exports will total about Dr. 188 million, which will have to be paid by the Greek Government.

The 1966 harvest of wheat and barley combined exceeded domestic use by about 340,000 metric tons. Preliminary estimates indicate that this year the combined harvest will exceed domestic use by 450,000 metric tons. The sharp increase in the 1967 barley crop accounts for the additional increase in the grain surplus.

Meanwhile, livestock producers also have been able to purchase grain from the governmental granaries at a price lower than the price paid grain producers, although the sale price to the domestic

Table 5. Projected Feedgrain Production Costs 1/

Item	1966	1970 Projected	1975 Projected
Barley	1,017,178	1,091,205	1,055,640
Corn, nonirrigated	330,075)	653,200	713,050
Corn, irrigated	420,543)	630,000	1,097,000
Oats	421,335	427,560	253,880
Wheat	<u>2/ 98,158</u>	<u>50,910</u>	<u>23,817</u>
Total	2,287,289	2,852,875	3,143,387

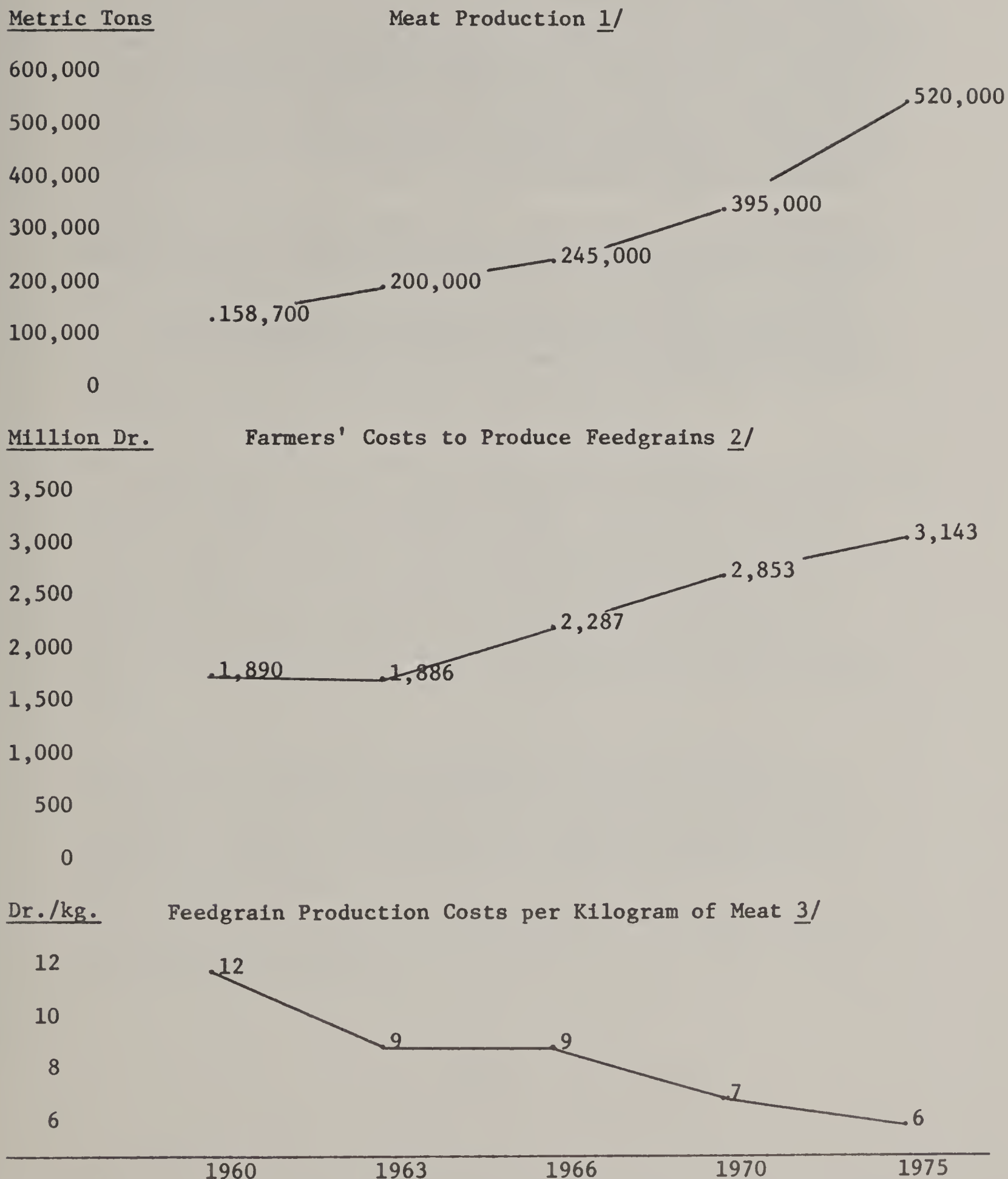
1/ Drachma per metric ton, farmer costs of production at 1966 prices:

Barley	1609.6	1233.	926.
Corn, nonirrigated	2787.0)	2680.	2194.
Corn, irrigated	2060.0)	1750.	1570.
Oats	2423.0	2036.	1614.
Wheat	1740.4	1414.	1154.

Above costs per metric tons times metric tons of grain in table 4.

2/ Assumes 56,400 metric tons fed in 1966.

Figure C: Home Meat Production and Farmer Costs
to Produce the Needed Feedgrains,
Selected Years



1/ From table 2. 2/ Developed from enterprise cost data supplied by Ministry of Agriculture, Agricultural Bank, and others. 3/ Calculated from data above, rounded to nearest drachma.

livestock producers was higher than the export sale price. The difference between the sale price to domestic livestock producers and the price paid grain producers is estimated at about Dr. 292.5 million.

This is equal to about Dr. 1.2 per kilogram of meat produced in 1966. To the extent that this reduced selling price permitted meat prices to be lower than they would have if grain prices were pegged at the purchase price level, the public was able to recoup some of this grain subsidy to farmers in the form of lower living costs.

Nevertheless, the cash cost to the Greek Treasury on the grain sold to domestic livestock producers and on the grain exported in 1966 will total about Dr. 480 million.

It is physically possible and economically desirable for Greece to produce enough meat to be almost self-sufficient.

LIVESTOCK AND DAIRY TRENDS

Meat production in Greece has increased since 1960. But the expansion in livestock has not kept pace with increasing demand, which stems from the higher incomes among the growing population and an expanding tourist business.

Beef and veal production in Greece has increased substantially in recent years. In 1965, it accounted for about 27 percent of the nation's total meat output, compared with 18 percent in 1960.

This increase by beef and veal in the share of the total meat output has been the result of both heavier slaughter weights and increased number of cattle raised. The main reason for the increased slaughter weights probably is the governmental subsidy of Dr. 2 paid the producer for cattle marketed which weigh over 300 kg. liveweight. Average cattle and sheep slaughter weight still is too light, however.

The percentage of the nation's total meat production represented by poultry has also increased steadily, increasing from 12 percent in 1960 to 15 percent in 1965. This is a result of both an increase in the total amount produced and an increase in bird size. A 1966 study by the International Bank for Reconstruction and Development and the Food and Agriculture Organization (FAO), however, indicates that the feeding efficiency of the poultry industry still lags somewhat behind that of the more developed poultry-producing countries of the world.

Hog production has remained steady over the past decade. However, the tonnage of pork produced rose from 28,000 tons in 1960 to 40,000 tons in 1965 as a result of an increase in slaughter weight. The share of the nation's total meat production represented by pork has remained constant at 17 percent since 1960.

In Greece, pork is sold as suckling pigs or as fresh carcass meat from mature hogs.

Sheep and goats, on the other hand, have declined in importance as a source of meat. In 1960, they accounted for slightly over half of Greece's total meat production. By 1965, sheep and goats accounted for only 40 percent of the nation's total meat output. Two main factors account for the decline in the importance of sheep. One is the rising cost of labor. This bears heavily on sheep and goats which require a herder. The second is the growing lack of interest of herders in herding sheep in the mountains. Sheep and goat numbers changed little between 1960 and 1965.

Because emphasis is on the slaughter of young sheep, there has been only a limited gain through increase in slaughter weight. It is estimated that about two-thirds of all sheep slaughtered are milk lambs weighing about 15 to 16 pounds. With goats, the emphasis also is on milk kids and younger animals. Carcass weights of lambs and kids are estimated to have increased about 10 percent between 1960 and 1965.

The emphasis on younger animals is partly the result of the following: (1) The desire to use the milk for human consumption, (2) the custom of eating young lambs at Easter, (3) the desire to sell the young lambs before the hot summer winds come, (4) the lack of experience in feeding lambs for further gains after weaning, and (5) the belief that the meat of older animals is tough.

The dairy situation is basically the same as that for meat. Production has failed to keep pace with demand, and the deficit has had to be made up by importing more dairy products. The dairy problem is complicated, however, by the problem of quality. Much of the milk produced in Greece is of poor quality because of poor production and cooling facilities on the farms. Milk of good quality is mixed with that of poor quality, the result of which is milk of inferior quality. Thus, the dairy deficit is in dairy products of known quality. On the other hand, Greece has a surplus of low-quality cheese.

The pattern of dairy output has changed. Sheep and goats have declined in importance as a source of milk as a result of the relative stability in their numbers between 1960 and 1965. On the other hand, production of cow's milk has risen at an estimated

rate of 10 percent per year. But it still is far below the level produced in the countries with a more developed dairy industry. The cows are inherently low producers.

In Greece, the average herd is small, one or two cows. Typically, these cows are "kept," not managed for modern dairy production. Low production, small herd size, and excessive use of labor make milk production a high-cost operation in Greece.

High standards of milk production have not been maintained. The standards of milk processing plants are higher than those of other types of processing plants, but the consumer cannot be certain that they are always maintained. As a result, the domestic market finds itself with a milk surplus which it has been forced to use to produce cheese for export.

This has left the dairy industry with the seeming contradiction of a surplus along side a general shortage of dairy products.

DEMAND FOR LIVESTOCK AND DAIRY PRODUCTS

The Demand for Meat

In Greece, consumer preference for beef and poultry seems strongest. During the 1955-63 period, a period during which prices of meats showed little change, per capita consumption of beef rose at a rate of 3.15 percent yearly and per capita consumption of poultry at a rate of 2.6 percent yearly. On the other hand, per capita consumption of sheep and lamb declined at a rate of 1.9 percent yearly and per capita consumption of pork at a rate of 0.6 percent yearly.

The Center of Planning and Economic Research estimates that the demand elasticity for all meat and poultry will be 0.9 percent for the 1966-75 period, and projects a 0.7 percent elasticity for the 1970-75 period. This assumes a 6-to-7-percent increase in per capita income and a continued rise in tourism at the present rate.

This projection indicates that the per capita consumption of all meat and poultry in 1970 will be 34 percent greater than it was in 1965. The projected per capita consumption of all meat and poultry for 1975 is 66 percent greater than that in 1965.

According to the projections of the Center for Planning and Economic Research, if the recent trend of an increase in consumer preference for beef and poultry continues the projected percentage increase in total meat consumption for 1970 and 1975 over 1965 will be as follows:

Year	Beef	Sheep and Lamb	Pork	Poultry	Other	Total
	<u>Percent</u>					
1970	60	21	19	58	67	39
1975	124	34	40	127	133	78

Suppose domestic production of meat and poultry in Greece increases between now and 1970 at the same rate as it has for the past 10 years. If it does, the projection of meat consumption points to a sizable deficit in domestic meat production, which will be mainly beef and sheep.

The following tabulation indicates the relationship between the projected domestic production and the projected consumption of different meats for 1970 and 1975.

Type of meat	1970	1975
	<u>1,000 metric tons</u>	
Beef	-60 Deficit	-77 Deficit
Sheep	-43 Deficit	-50 Deficit
Pork	+1 Surplus	+8 Surplus
Poultry	-7 Deficit	+20 Surplus
Other	-20 Deficit	-28 Deficit
	-129 Deficit	-127 Deficit

This analysis by the Center for Planning and Research concludes that Greece continues to have a sizable deficit in its production of beef and sheep. It is about holding its own on pork, but will produce surplus poultry, if the production and consumption trends of the past 10 years continue to prevail in the face of the projected population, income, and tourism changes between now and 1975.

The Demand for Dairy Products

Consumption of dairy products in Greece is low. Per capita consumption of fluid milk and many of its byproducts lags considerably behind per capita consumption in both the European Common Market (EEC) area and the United States. If dairy consumption in Greece were increased to even the minimum levels recommended by nutritionists, a significant increase in production would be needed. The Center of Planning and Economic Research in its "Five-Year Economic Development Plan for Greece" projects a 33-percent increase in the demand for milk and milk products in 1970 over the demand in 1965.

In Greece, milk from cows is used for fluid consumption, ice cream, and special cheese.

Lack of satisfactory fluid milk for consumption has restricted the use of cow's milk for this purpose. Rising city incomes and increasing tourism made this potential demand for milk particularly promising.

The desirability of producing dried and evaporated milk in Greece is questionable. Greece's participation in the EEC places its dried and evaporated milk in direct competition with high-quality, low-cost milk from the Netherlands. Unless adequate quantities of milk of good quality are available daily, processing costs will be high, compared to those in Holland.

COSTS AND RETURNS FROM LIVESTOCK PRODUCTION

Feed Costs

Official sale prices per kg. for grains sold at the Government warehouses in early April 1967 were Dr. 2.10 for barley, Dr. 2.10 for wheat, and Dr. 2.35 for corn.

At the same time, non-governmental sources were selling bran at Dr. 1.50, wheat screenings at Dr. 1.35, oats at Dr. 2.25, linseed meal at Dr. 4.00, cottonseed cake at Dr. 2.10, and soybean meal at about Dr. 4.50 per kg. Alfalfa hay was priced at about Dr. 2.00 per kg. in early April. However, reportedly it could be purchased at about Dr. 1.25 per kg. or less at harvest time.

In early April, Government regulations required a farmer who applied for the purchase of Government-owned grain to accept one-third corn, one-third wheat, and one-third barley. This action was designed to force greater use of wheat and barley for feeding, since there was a surplus of both.

Grinding and mixing costs add another Dr. 0.10 to Dr. 0.20 per kg. to the feed costs of farmers. No rolling facilities currently are available in Greek feed mills, which prevents the rolling of barley for livestock feed.

Costs and Returns from Fattening Cattle

In early 1967 several Greek farmers were fattening under supervision cattle imported from the United States under an agreement with the American Farm School and the U.S. Feed Grains Council. These farmers were using rations recommended by the American Farm School. The rations (which include trace minerals, vitamin additives, and salt) resulted in a typical cost of about Dr. 2.5 per kg. for the concentrates fed cattle on the farms in late March.

The imported cattle were fed from 4 to 6 kg. of concentrates and from 1 to 2 kg. of alfalfa daily. A minimum gain in weight of 1 kg. daily was the target. This requirement was being met

by those feeders whose feeding and management practices were good, according to officials of the American Farm School, who were visiting the farms where the calves were being fattened. In late March, the calves were estimated to weigh around 400 to 450 pounds.

A group of cattle imported earlier from the United States had been on feed at the Agios Mamas Experiment Station for a longer period. These cattle had reached slaughter weight in late March. Preliminary reports indicated an estimated daily gain of 1.145 kg.

These cattle were given a daily ration of 6 kg. of concentrates and 1 kg. of alfalfa. Using the average cost to the farmers of Dr. 2.50 for concentrates, this resulted in a daily feed cost of Dr. 17, or about Dr. 14.85 per kg. of gain (23.44 cents per pound).

Based on the above cost of gain, the following table compares the costs of and returns from feeding specified kinds of cattle in Greece.

Table 6. Costs of and Returns from Feeding Specified Kinds of Cattle

Item	Kind of Cattle			
	U.S.	Yugosla-	Greek	Greek
	Baby	vian	Light	Light
	Calves	Calves	Cattle	Cattle ^{1/}
Purchase price				
per kg. (Dr.).....	66	21	21	21
Initial Weight (kg.)...	50	200	150	150
Cost (Dr.)	3,300	4,200	3,150	3,150
Gain Needed to Reach				
400 kg. (kg.)	350	200	250	250
Feed Costs (Dr.)	5,198	2,970	3,712	4,270
Interest @ 7% (Dr.) ...	595	509	480	519
Death Risk (Dr.)	<u>2/165</u>	<u>3/84</u>	<u>3/63</u>	<u>3/63</u>
Total Cost (Dr.)	9,258	7,761	7,405	8,002
Sale Income (Dr.)	8,800	8,400	8,400	8,400
Return to Labor (Dr.)..	-458	+639	+995	+398

^{1/} Assumes a 15-percent increase in feed requirement. ^{2/} 5-percent death risk. ^{3/} 2-percent death risk.

There is a small market in Greece for meat comparable to U.S. choice grade meat from the supermarket restaurants which cater to the tourist trade and some of the foreigners who live in Greece. This analysis leads one to conclude, however, in Greece, where it is the policy of the Government not to permit meat comparable to that of U.S. choice grade to be sold at a higher price than other cattle, the initial cost of American calves is too high to result in a profit.

The above analysis of costs and returns does lead one to conclude that even with current feed costs, cattle can be profitably fed to heavier weights, if proper rations and proper management practices are used. This conclusion is strengthened when the grains are priced at export prices and the hay at harvest prices.

The sale price of wheat exported from Greece in 1966-67 was in the neighborhood of from \$55 to \$65 per metric ton, or Dr. 1650 to Dr. 1950. Any exports of barley probably would be sold at about the same price.

Thus, potential feed concentrates this year are being exported from Greece at a price of about Dr. 1.65 to Dr. 1.95, in contrast with the price (Dr. 2.10) that wheat and barley are being offered to livestock producers.

If the wheat in the ration had cost Dr. 1.80 instead of Dr. 2.10, and the alfalfa purchased at the harvest price, the cost of the fattening ration would have been reduced from Dr. 17 to about Dr. 15.5 per day, or by about 10 percent.

This would have been sufficient to have made the American baby calf feeding project to slightly more than cover feed costs, death risks, and interest charges. And it raises the returns to labor and management on the calves from Yugoslavia to Dr. 957 (about \$32.00 per head) and on light cattle produced in Greece to Dr. 855 (\$24.50 per head).

Table 7. Effect on Fattening Costs of Pricing Wheat and Barley
at Export Prices and Buying Alfalfa at Harvest,
Compared with Prices Actually Paid
Late March, 1967

Item	Kind of Cattle			
	U.S. Baby Calves	Yugosla- vian Calves	Greek Light Cattle	Greek Light Cattle ^{1/}
	<u>Dr.</u>	<u>Dr.</u>	<u>Dr.</u>	<u>Dr.</u>
Feed costs based on actual late March prices	5,198	2,970	3,712	4,270
Feed costs based on export grain prices and Alfalfa purchased at harvest	4,678	2,673	3,341	3,843
Reduction in feed costs ..	520	297	371	427
Reduction in interest	36	21	26	30
Net return to labor and management using actual: prices	-458	+639	+995	+398
Net return to labor and management using ex- port grain prices and purchase of hay at harvest	+98	+957	+1,392	+855
Cost per kg. of gain in weight	15.43	16.22	15.43	17.81

^{1/} Assumes 15 percent increased feed requirement.

Beef Production

The dairy industry in the remote mountain villages with poor transportation facilities faces almost insurmountable problems. The milk must be processed into cheese under conditions which make it very difficult to produce the quality of product needed to find a satisfactory market.

Probably the best alternative for farmers under such conditions is to switch to beef production. A cross between a native cow and a Brown Swiss bull could probably be produced. Typical breeds of beef cattle, such as Shorthorn, Angus, or Hereford, probably are not the best choice in these mountainous areas. Furthermore, the Brown Swiss cross probably will grow faster. Such crossbred calves should weigh 150 kg. each by weaning time. These calves then can be sold to farmers in the grain-producing areas (such as those described in the previous section of this report) for fattening. Thus, the cow's milk would be sold in the form of the calf, rather than in the form of cheese.

If such calves are sold at 21 Dr. per kg., the gross return per cow would be Dr. 3150. With wintering feed costs estimated at about Dr. 1500, this would give a net return of about Dr. 1650 per cow. A mountain family with 20 calves to sell would have an income of about Dr. 33,000.

It is obvious that when the cattle are not milked more can be handled per person than now. This means fewer people living in those mountain villages, but a better living for those who do live there. Production of calves under conditions described here can offer a local source of cattle for fattening. A Brown Swiss-native cow cross will yield about the quality of carcass that at present is in most demand in Greece.

Sheep Production

Rising labor costs influence greatly the comparative economic position of sheep raising in the present livestock economy of Greece. A herder is presently paid Dr. 15,000 per 6 months of work. The size of a typical flock cared for by such a herder is 100 sheep, of which about 70 will be productive ewes. The labor needed for milking the ewes limit the number of sheep that can be cared for.

A typical ewe produces 100 kg. of milk, worth Dr. 6 per kg. About 2 kg. of wool, worth Dr. 33 to 38 per kg. if white and about Dr. 5 less per kg. if brown, can be sheared from it. Where the ewe is milked, the lamb will be sold at a weight of about 10 kg. for Dr. 35 per kg.

If a herder does not milk his ewes, he can care for more sheep. Crossing a native ewe with a Merino ram would produce a heavier lamb from whom a greater quantity of good 100 percent white wool could be sheared. Greek livestock specialists estimate that sheep of this type should shear about $3\frac{1}{2}$ kg. of wool. Sheep specialists at the U.S. Department of Agriculture (USDA) concur in this. Current prices of imported wool range from Dr. 45 to 48 per kg. A lamb nursed for $3\frac{1}{2}$ months should weigh about 22 kg. by marketing time.

Table 8 compares the results of these two methods of flock management. When hand milking is eliminated, total income per ewe is reduced. However, the increased number of sheep handled per man much more than offsets this. Thus, the reduced labor costs per ewe increases the net income per ewe from Dr. 159, if the ewes are milked, to Dr. 356 per ewe when the meat and wool are the only products to be sold. Net return from the sheep enterprise increases from about Dr. 11,000 to nearly Dr. 75,000.

It would appear that in those mountainous areas of Greece where sheep adapt best, the sheep enterprise should be operated as a straight wool-meat enterprise rather than one handling milk. This would eliminate the problem of marketing sheep milk from almost inaccessible areas.

Since Greece imports both meat and wool, the increased output of both of these products resulting from such a change in the organization of the sheep industry in the mountainous area would bring about changes in production that would be in the national interest. In addition, it would raise per capita income in the mountainous areas, where farm income tends to be low.

However, the total number of people needed in sheep production will be reduced. Thus, some persons in agriculture in these mountainous areas will have to shift to other segments of the economy.

Table 8. Costs and Returns from Two Methods
of Sheep Management in Greece

Item	Flock Management Method	
	Milk-Meat-Wool	Meat-Wool
Number of Ewes	70	210
<u>INCOME</u>		
Milk (Dr.)	42,000	--
Wool (Dr.)	4,620	33,075
Meat (Dr.)	24,500	161,700
Total (Dr.)	71,120	194,775
<u>EXPENSES</u>		
Labor (Dr.)	30,000	30,000
Feed & Other (Dr.)	30,000	90,000
Total (Dr.)	60,000	120,000
<u>NET INCOME</u>		
Total (Dr.)	11,120	74,775
Per Ewe (Dr.)	159	356

Dairy Production

The dairy industry can operate profitably in Greece at present prices and costs if milk of good quality is produced from good dairy cows that are properly managed.

The first requirement for a profitable dairy operation is adequate production per cow. A minimum of 3,500 kg. of milk per year should be the production target. Dairy cows with the ability to produce this quantity of milk are a necessity. Then, the cows must be fed and cared for properly.

American dairy scientists believe that the tendency by Greek farmers to keep dairy cows tethered in a stable probably prevents these cows from being most productive, and most certainly results in the use of an excessive amount of labor. In the United States, succulent forage is considered a vital part of an economical dairy ration. Virtually none is used by Greek farmers. A general observation of the kind of hay being fed dairy cows in Greece also leaves one with the impression that it would be possible to lower feed costs by improving the quality of the hay produced.

The next requirement concerns the care and management of milk to insure that high-quality, sanitary milk is delivered to dairy plants. Clean milking stables, milking methods and utensils, and proper cooling and care of milk in a clean milk room are required.

That a dairy operation meeting these requirements is profitable in Greece is evidenced by the comparison shown in Table 9. Although the U.S. herds had an average production per cow of 1000 kg. more milk than the herds at the Institution of Tossitsa, net income from the Greek herd was greater than the average income of the American herds. The average price of milk from both the Greek and American herds was about the same.

The amount of labor used per cow in the Greek herd, however, is somewhat greater than that used per cow in the American herd because of the tendency of the Greek's to keep the cows tied in the stable much of the time.

Table 9. Comparison of Returns over Feed Costs between
Institution of Tossitsa Dairy Herd, Athens, Greece,
and 38,879 Dairy Herd Improvement Association Herds in U.S.

Item	Institution of Tossitsa	Dairy Herd Improvement Association of U.S. <u>1/</u>
Milk production (kg.)	<u>2/</u> 4,500	5,500
Concentrates fed (Kg.)	1,600	2,045
Succulent forage (Kg.)	none	4,909
Dry forage (Kg.)	2,920	1,636
Value of production (Dr.) ...	<u>3/</u> 15,900	<u>4/</u> 16,770
Concentrate		
Total Cost (Dr.)	4,000	3,990
Per Kg. (Dr.)	2.50	1.95
Total feed cost (Dr.)	7,212	7,680
Income over feed cost (Dr.) :	8,688	5,640

1/ Average of 38,879 herds, averaging 53 head per herd, for year 1966, equal to over 13 percent of all dairy cows in U.S.

2/ Actual production average 1960-63 when herd was 10 cows.

3/ Milk valued at Dr. 3 per kg. and 5-day-old calf at Dr. 2400.

4/ U.S. average farm price all milk sold in 1966 was Dr. 3.06 per kg.

One of the big problems faced by the Greek dairy industry is lack of skill in dairy management. The small size of the typical dairy unit accounts for much of this. Management skills cannot be developed in a dairy unit of from 1 to 3 cows. The small size of units increases the cost of collecting milk from farms and of transporting it to dairy plants, makes it more costly to supervise and check methods of handling milk.

Since the native dairy cows of Greece lack the production capability needed, it will be necessary to import better stock, high-grade heifer calves and bred heifers. But these cattle should not be imported any faster than there are dairymen capable of successfully managing them. To do the opposite is wasteful.

Hog Production

Feed requirements for hog production in the United States are virtually the same as they are for hog production in Greece, assuming the level of management in the two countries is the same.

A good hog producer in the main hog-raising area of the United States requires about 350 pounds of concentrates and 50 pounds of protein supplement to produce 100 pounds of marketable live hogs. This constitutes the amount of feed needed to maintain the breeding herd as well as that required to raise the weights of offspring to a slaughter weight of about 100 to 110 kg.

The number of pigs marketed per litter will average about 8. The ration for these pigs consists mainly of corn, with some rolled oats, added when the pigs are small.

American farmer will require about 425 to 450 pounds of concentrates along with 60 to 70 pounds of protein supplement to produce 100 pounds of marketable pork. Using the same level of feed requirements for hog production from American breed hogs, in Greece a hog producer would need 4.35 kg. of concentrate and .65 kg. of protein supplement to produce 1 kg. of marketable live hogs. A greek ration of corn, wheat, and barley with proper supplements should give the same results as a U.S. ration of corn and supplements.

If concentrates cost Dr. 2.25 per kg. and protein supplement Dr. 4.50 per kg., total feed costs in Greece amount to about Dr. 13 per kg. of live hog.

The current selling price for hogs in Greece is about Dr. 20 per kg. (liveweight). This is about 50 percent more than the cost of feed for producing hogs. In other words, hog production under adequate management in Greece should yield a return of about 150 percent per drachma of feed used. In the United States, the long-time average return is about 140 to 145 percent per dollar of feed used.

Apparently hog production could be profitable in Greece if hog raisers used American methods of breeding, and followed American feeding and management practices. With proper training Greek producers are capable of doing this; however, it would require some specialization. Specialization to any degree on a farm with only one or two sows is highly unlikely. A minimum of 10 sows per producer, with the sows farrowing twice a year, would be needed to make a hog-raising project a profitable business. The pigs should be marketed at 6 months of age, and should weigh about 100 kg. each.

In general, livestock producers in Greece have little knowledge of the breeding of hogs and of good feed and management practices. Therefore, a demonstration showing the best methods of breeding, feeding, and managing livestock is needed. Greek farmers can then observe desirable techniques.

Broiler Production

Under present management practices, broiler producers in the area around Khalkis require 2.5 kg. of feed to produce 1 kg. of broilers, according to the agricultural bank at Khalkis. The average broiler producer is reported to handle about 1,000 birds per batch.

In contrast, broiler producers in Germany require 2.2 kg. of feed to produce about 1 kg. of broilers. The average producer is reported to handle 5,000 birds per batch. In the United States, the typical broiler grower handles over 10,000 birds per batch.

In Greece, broiler producers require more feed to produce 1 kg. of broilers than producers in Germany, and produce only a fifth as many birds per person than their competitors in the Common Market. The number is well below that handled by producers in the United States.

Most of the broiler growers in the United States have the benefit of advice from field men employed by feed companies or cooperatives. These field men have had specialized training in disease control, and the feeding and management of broilers. By visiting the growers regularly and maintaining close relationships with them, these specialists have played a major role in increasing the efficiency of the American broiler grower.

Egg Production

Egg production in Greece is concentrated in the Megra area. Profits from egg production are not satisfactory to the producers, who consider the major source of their troubles to be poor marketing. Some are inclined to blame the Government for their problems.

However, the major problem confronting the egg producers of Megra is the high cost of production. There are several reasons why production costs are high. One of the major causes is the extremely heavy concentration of hens in one small area. It is one of the heaviest concentrations of poultry in the world. This causes a severe problem of sanitation. Large expenditures for drugs have to be made to alleviate it. Another difficulty is a very high fixed cost due to the expensive laying houses that are common in this area. In addition, the layout design of these buildings are poor, requiring an excessive amount of labor per hen. Finally, the units of production are small, which also contributes to a high labor cost per bird.

The solutions lie in halting the concentration by no further expansion in construction of laying houses in the Megra area. Better design and layout of laying houses is needed. Construction need not be very expensive, and layout should facilitate the handling of a larger number of birds per person. Consideration needs to be given to the possibilities of remodeling present laying houses.

The sanitation problem can be attacked also by stopping production of broilers and the raising of replacement pullets in the Megra area. This would separate adult birds from young chickens. The pullets should be raised in another area and brought into Megra.

Finally, the size of the production unit, that is the number of layers handled per person, must be increased. The poultry industry has become big business. If Greece is to become integrated into the European Common Market, it will have to lower its labor cost per layer by handling more birds per person.

One of the fundamental deterrents to advancement in livestock and poultry production in Greece is the basic philosophy of many Greek farmers toward livestock. They tend to view their livestock as beasts which are supposed to serve them. They fail to see the livestock as productive capital units which could provide them more income if they were to employ better feeding and management practices.

MARKETING

Marketing is the process by which products are moved from the producer to the ultimate consumer. It can be simple, or complex. It all depends on how far the consumer is from the farm and what must be done to the farmer's product to bring it to the consumer in a condition and form acceptable to the consumer and at the place and time he wants it.

Thus, marketing was and is a relatively simple matter in a village which produces most of what it needs. Here the producer can sell directly to the consumer by displaying his goods in the village "market," or by selling to another local person who then in turn displays it in the "market." The village supplies many of the services needed for such a marketing system, for example, the space for the market and the slaughterhouse where individuals can slaughter their own livestock, or a butcher can do his own slaughtering.

A simple marketing system will suffice as long as each village can eat and is content to eat what is produced locally. This was the situation in the early days of Greece. But the situation has changed: the economy of Greece has expanded. The Nation has a larger population; some larger cities have developed; the tourists have come; transportation has advanced; the Greek people's wants have grown beyond what can just be produced in the neighborhood.

The simple marketing system of the early days is still adequate for the small, more remote villages. But it falls far short of filling the needs of those people for whom all direct contact with the agricultural population has gone--people who live in the cities and those who desire to draw on products from areas beyond the nearby locality.

What's more, an advance in the level of living is generally associated with increased specialization. This applies to marketing services as well as production. In the case of many agricultural products, dairy products and meats, for example, special handling is almost essential. This is so because of the need to control spoilage, maintain good sanitation, and

in the case of meats, the need to utilize byproducts. Specialization also helps reduce the costs of processing and distribution, and of expanding market outlets.

In Greece, an advanced and modern marketing system is now essential. Without it, Greek farmers cannot develop the production skills needed to modernize the meat and dairy industry and to raise the output of meat and dairy products per man.

A marketing system must make consumer demands known to the producer and provide him the incentive to produce those products demanded.

Greece's present marketing system for meat and dairy products is not as simple as the old village marketing system. But in too many instances it has been a case of modernizing by, figuratively speaking, "painting over the rust."

Dairy processing plants enjoy the advantage of specialization. But the consumer is not assured a sanitary product of good quality, nor have the plants given producers the incentive to produce products of this type.

The shortcomings of the meat marketing system are more pronounced. The present slaughter facilities are an adaptation of the old village-type slaughterhouse. Inedible byproducts are not utilized. There is virtually no specialization in these slaughterhouses or in the merchandising of the meat. Refrigeration facilities are lacking. Sanitation often is questionable.

Retail price restrictions prevent the merchandising of meat so that it is advantageous to the consumer and the producer. Pricing methods fail to give the farmer the incentive he needs to make progress in livestock feeding. Meat processing facilities are inadequate. Savings from large-scale slaughtering and retailing are not being realized.

It is apparent that until the needed changes are made in the meat and dairy marketing systems, Greece will not realize its production potential for these products.

Meat Marketing

There are many problems to be overcome in the present meat marketing system. These include the present regulations of the market police, the attitudes of most consumer, and the entrenched interests of butchers and retailers.

A modern marketing system makes it possible for the producer to receive an adequate return on his investment, and for consumers to purchase meat and meat products at favorable prices.

The cost of operations in a modern meatpacking industry should add as little as possible cost of the end product, in keeping with sound slaughtering and processing practices. An efficient, low-cost distribution system is essential to the operations of the modern meatpacking industry. This means that products must move to consumers by the most direct means possible.

Basic Requirements

1. Construction of a few new, small private packing plants of modern design, properly managed and manned, and located near the source of livestock.
2. Full utilization of both edible and inedible byproducts.
3. A change in the traditional transportation system. This means transporting meat instead of live animals to the people in Athens.
4. A retail price structure which provides adequate return to investors and those involved in the distribution, with a differentiation between where the meat is cut and handled under the supermarket style of distribution and where it is handled in the customary way.
5. A continuous program to improve the quality of livestock and to control disease to permit the delivery of 12-to-18-month-old fattened animals to the packing plant for maximum turnover in investment for livestock producers and most efficient utilization of feed in the country.

Basically, the biggest problem with a municipal slaughterhouse is that it acts only as a service agency. It has nothing to sell. It does not lend itself to an integrated meatpacking operation which is interested in selling meat and salvaging all of the byproducts. You cannot combine the procurement, slaughter, cutting, and sale of livestock in one efficient operation in a municipal slaughterhouse as you can in an integrated meatpacking plant.

A municipally owned slaughterhouse limited to a single service cannot be easily converted into an effective integrated meatpacking business. The basic purpose of a municipal slaughterhouse is to provide a slaughtering service for a fee, which provides the municipality with an income. Municipal slaughterhouses generally are the responsibility of a person who collects the fees and broadly oversees the operation but has no direct responsibility for the actual operation. The slaughter operation, therefore, generally lacks the qualified continual direction to produce the results needed to meet modern meatpacking and meat distribution standards. There is lack of interest in the total operation of a meatpacking business, including the purchase of livestock, distribution, and sale of meat to trade outlets, and recovery of byproducts.

It might be possible to operate a municipal slaughterhouse that would meet all sanitation requirements. Slaughterhouses of this type would be superior to ones now in operation, but they would not serve as substitutes for small integrated packing plants.

A modern meatpacking industry must deliver a product to the consumer that will consistently pass the test for quality, appearance, and sanitation with the smallest possible marketing margin.

Full Utilization of Byproducts

A municipal slaughterhouse is a place for killing animals. A modern packing plant with facilities for processing meat can utilize byproducts better. Animal byproducts such as the tongue, heart, liver, and kidneys can be processed into canned meat or sausages. In addition, the inedible byproducts can be processed into animal and poultry feed. In the United States, a packing plant often recovers from 10 to 12 percent of the value of its live animals from byproducts.

There is a ready market in Greece for both edible and inedible byproducts--processed meat, soap, fertilizers, animal feeds, properly handled hides, and the like. Poor slaughter practices often result in sizable losses on hides.

Price Structure

Most of the present regulations set by the market police on prices of meat do not apply to meat cut and merchandised "American style."

Some regulations, for example, those requiring that ground beef be ground in the presence of the customer, make prepackaging illegal. Thus, these regulations are impeding the development of a modern meat merchandising system. For example, in April of this year the A-B supermarket was merchandising about 10 carcasses weekly. This is too small a volume to effectively carry the overhead necessary for a self-service meat department. This is particularly true when a retailer is hamstrung by market police regulations that are not suitable for his method of merchandising.

The Greek people prefer meat from small carcasses. This stems from their belief that animals weighing 300 to 400 kg. live are mature animals, and the meat is tough.

Most Greek consumers have had little or no experience with young grain-fed animals which can reach a live weight of 350 to 400 kg. at 12 to 14 months of age. The meat from these animals has just enough fat to make it tasty, but not that layer of fat characteristic of the beef from heavy grain-fed animals sold in U.S. supermarkets.

The same types of problems existed when Greece set out to expand its tourist business. Yet, the Greek Government and the Greek people were sufficiently resourceful to solve these problems. No attempt was made to force the same market police regulations on every hotel. Instead, regulations varied according to the class of each hotel. Regulations for those in the luxury class, such as the Hilton and the other hotels which offered only the best of service differed from those for the class C hotels, which offered less. In the process, the quality of hotel service in Greece improved.

A similar approach should be taken in the meat business. A new class of retail meat service should be established which would cater to those who want to pay for extra service and quality. The market police price regulations for such outlets should be somewhat different from those for the regular retail outlets.

The regulations setting higher prices on meat should be limited to those retail outlets which cut meat "American style." In this way, both the retail outlet and its products could be readily identified and differentiated from the regular meat markets, which remain subject to present market police regulations as long as they continue to cut and market their meat in the traditional style.

Thus, these new outlets and methods of marketing can serve as models for the whole meat marketing industry in Greece. This, in turn, will tend to improve retail meat marketing as the production of more 350-to-400-pound young fed beef increases.

Selling Live Cattle

The marketing of live cattle also needs to be improved. The present tendency to buy cattle by the head often puts the producer at a disadvantage. Moreover, he doesn't see what premium, if any, he is getting for livestock of better quality. If the price bid for good livestock were more than that for poor livestock, he could readily see the returns possible from the production of high-quality calves.

Most important, it is very difficult for a producer to compare prices offered, except by getting a bid on his own cattle. He can't ask a buyer how much he is paying per kilo, gather information from the radio, or ask somebody who has sold cattle what the market price is and then translate this to his own cattle. No market news program can be fully successful if cattle are sold by the head.

Thus, a fertile field for the local cooperatives in Greece would be local livestock auctions. Portable scales that can be moved from one local auction to another could be used to weigh the cattle. Sales could be scheduled at regular intervals, depending on the amount of livestock to be sold.

Dairy Marketing

As mentioned previously, the problems confronting the dairy industry in Greece stem from two factors: (1) low production of milk per cow, and thus high-cost milk, and (2) the poor quality of dairy products, which restricts the market outlets for milk.

Milk delivered to the ASTY Cooperative Dairy plant in Athens, which should be the best milk produced in Greece, reportedly contains from 4 to 5 million bacteria per cc. in the summer and from 2 to 3 million in the winter. This is too high to permit the marketing of a product of satisfactory quality, regardless of whether it is fluid milk or a manufactured dairy product. The dairy plant has no farm program designed to improve the quality of milk it receives. The same is true of milk at the EVGA plant, a privately owned dairy in Athens.

Incidentally, both the privately owned dairy and the cooperative seemed to have an excessive number of workers, which tends to increase marketing costs.

The matter of quality lies at the root of the dairy marketing problem. Because local milk is of such poor quality, the doctors advise the mothers to use imported condensed, evaporated, and powdered milk for their children. The foreign residents of Athens are given the same advice. Thus, Greece imports a sizable quantity of dairy products from other countries.

The solution to this problem is not just to produce evaporated, condensed, or dried milk in Greece. The quality of the milk produced would still be unsatisfactory. The problem will not be solved until farmers and processors produce milk of better quality that is acceptable to the medical profession of Greece.

Probably the best way to tackle this problem is through demonstrations. First, Greek dairymen must be shown techniques for producing economically milk of acceptable quality. Second, it must be demonstrated to members of the medical profession in Greece that their own dairymen can produce milk that they can recommend for use by the mothers and children of the country.

The milk acceptable to the Greek doctors should carry a label designating it as "certified" or some similar title. The retail price of this milk should be slightly higher than that of milk not so certified so as to cover the cost of regular inspection of the production of it.

If these demonstrations are effective, the standards for the production of all fluid milk sold in Greece should gradually rise.

Broiler Marketing

The broiler-producing areas of Greece lack adequate cold storage facilities for the proper marketing of their broilers. This is particularly true in the Evia area.

The broiler growers' cooperative should perform a marketing function. To perform this function, it should do the following:

1. Establish a slaughter facility or arrange, through contract with a privately owned establishment, for the slaughter and dressing of birds grown by its members.
2. The Greek Government should complete the construction of the cold storage facilities at the Central Vegetable and Fruit Market in Athens. The cooperative could then use these facilities.
3. Establish its own sales office, or arrange, through contract, to have a private broker make sales, with primary responsibility for representing the interests of the grower.
4. Attempt to schedule the hatching of broiler chicks to coincide with the expected later sales of mature broilers.
5. Investigate the possibility of contracting with the supermarkets of Athens to produce broilers.

CONCLUSIONS

1. Greece is now producing surplus grain.
2. Greece is exporting its surplus grain at a loss, and at the same time importing meat, dairy products, and wool with scarce foreign exchange.
3. If present trends in production and utilization maintain, Greece will continue to have a grain surplus which it will export at a loss to the Government. In the meantime, the importation of meat, dairy products, and wool will cause an increasing drain on its foreign exchange.
4. If Greece shifts to the use of its land for the production of feedgrains and forage instead of wheat, its output of livestock and dairy products will fulfill the Nation's needs over the next 8 to 10 years.
5. Greece can make the necessary expansion and improvement in its livestock and dairy production, if the required steps or actions are taken to upgrade the quality of its livestock, to raise the level of feeding and management, to improve the quality of its products, and to modernize its marketing system.
6. Under the economic conditions which are likely to prevail for the next 8 or 10 years, Greece will find it economically feasible to increase and improve its livestock and dairy production.
7. During the next decade, Greece cannot afford to fail to take the steps or actions required to use its grain surplus for the production of meat and dairy products.
8. The best way for Greece to introduce modern technology to its livestock industry is to establish enterprises which meet economic criteria and which employ management methods used by firms in the United States.

9. The Greek Government might find the establishment of a livestock development corporation that had full responsibility for a program to improve its livestock and dairy industries a better tool than any available to it. If the Government doesn't approve a proposal to establish this corporation, some other means should be considered as soon as possible.

SUGGESTED ACTIONS

Land Use

1. In Greece, land now used to produce wheat will, in the long run, have to be used for the production of feedgrains and high-yielding forages. In the immediate future, the shift of land for the production of barley should be stopped. All prices set by the Government should be structured so as not to interfere with these plans. Where possible, positive action should be taken to encourage these actions.
2. The Greek Government should announce early that in 1968 it will not purchase wheat or barley grown on irrigated land. However, a market for the rest of the crop should be assured.
3. The price which producers receive for their barley and the price at which the Government sells barley to feeders should be lowered slightly to make barley more attractive as a feed and to encourage use of irrigated land for producing corn and high-yielding forages instead of wheat or barley. A slight drop in the price paid for wheat also may be desirable. Announcements of these actions should be made as early as possible to permit producers to better make their plans.
4. The Government of Greece should make a survey of the soil on all agricultural land in the nation, starting with the most productive areas, and progressing to the mountain pasture areas. Soil surveys are needed to provide a basis for local soil management practices necessary for high crop yields and good pastures.
5. Ranges need to be evaluated on the basis of their suitability for a given class of livestock. Improved pasture management is needed to raise the amount of feed livestock obtained from grazing.

6. On all public lands handled by the Forest Service, producers should be given strong encouragement to graze the type of livestock called for by the range classification. Improved practices regarding grass management, grazing, reseeding, fertilization, etc., on such forest lands should be employed as rapidly as possible.
7. On public lands controlled by a community, efforts should be made to get villages to agree to a demonstration of the results of improved management practices such as grazing half of an area, letting it rest, and then grazing the other half; and applying fertilizer in the fall to double grass growth later in the season.
8. Farmers should increase their planting and use of succulent forages. Corn silage, green chopped corn, and green chopped alfalfa yield a high return of nutritious feed per stremma. Greece now makes virtually no use of succulent forages.

Crop Management

1. Alfalfa should be cut at the proper time and harvested properly to increase its value as a feed. Studies are needed to determine the best time and method of planting and the best way to harvest alfalfa in Greece.
2. Demonstrations are needed of methods of making corn silage, green chopped corn, and green chopped alfalfa.
3. Greece should continue research on feedgrains, wheat, and legumes to discover new varieties and better management practices so as to maintain its competitive position in agriculture among the countries of the European Common Market and those of the rest of the world. Continued improvement in crop production will be needed to support a base for any growing livestock industry in Greece. Research is needed to determine the optimum level of fertilization, for example.

4. Studies should be made of the costs of raising two crops (wheat and corn, or barley and corn) in one year on irrigated land, and the returns from these crops.
5. A study should be made of the economic feasibility of establishing an alfalfa dehydrating industry in Greece.
6. Research is needed to determine the seriousness of salt water seepage on the land in areas where citrus is produced.

Livestock and Poultry Marketing

1. Laws and regulations should be changed to permit the establishment of privately operated livestock slaughterhouses. If the fear of a local revenue loss from such a step is an overriding factor, such private slaughterhouses could pay fees, based on number of livestock slaughtered, to the local governments.
2. Further expenditure of funds to rebuild or build new municipal slaughterhouses should be discouraged.
3. The establishment of one or more privately owned and managed meatpacking firms should be encouraged.
4. The market police should establish a separate and distinct set of regulations for the control of prices on meat that is cut and sold "American style." These regulations should apply only to those places which handle and sell meat in such a manner.
5. Livestock should be purchased on the basis of their weight. Permanent scales to weigh livestock should be installed at all locations where enough livestock are sold to make it practical. Portable scales jointly owned and operated by several villages can be used where the volume of livestock sold is not sufficient to warrant installation of permanent scales. The Ministry of Agriculture should check and test the accuracy of these scales periodically. The person

employed by the municipality to operate the scales should report the weight and price per kilo of all livestock sold that day. This report should be made to the local director of agriculture, who in turn should release the information as market news to the local newspapers and radio. A report for posting at prominent places in the villages should also be prepared and distributed. This market news information should be available to the public as soon as possible after the day of the actual sale. The Extension Service and the cooperatives should carry on an intensive program to explain to farmers the desirability of selling their livestock by weight of the animals. Farmers should be informed as to how to use market news reports to tell the value of their livestock. The Ministry of Agriculture should publicly notify all livestock buyers of its desire to have livestock bought by weight.

6. The construction of the cold storage plant at the fruit and vegetable market in Athens should be completed.
7. The cooperatives in the broiler-growing area of Evia should have their own slaughterhouses and cold storage facilities.
8. The Greek Government should take measures to avoid wide fluctuations in the prices of products on the local market resulting from the importation of commodities. If the imported commodities came from countries that have a subsidy on them, the Government should make a special effort to see that these measures are taken.

Dairy Marketing

1. A commission, including members of the medical profession, should be established to determine standards for fluid milk. Milk meeting these standards might be called "certified milk" or something similar. Regulations of the market police should be changed so that a slightly higher price might be placed on such milk.

2. A model dairy processing plant should be established at the Athens school. This plant could demonstrate how "certified milk" should be produced, bottled, and distributed. As the market in Athens for this grade of milk grows, the dairy cooperative and private industry could take over such a business. A similar operation might be started in Thessaloniki by the private milk distributors there, from milk produced from the Holstein heifer calves recently imported which are at the American Farm School. As the demand for higher quality milk grows, other producers who met the quality standards could begin to supply the milk also.
3. Standards should be gradually raised on milk sold through the regular channels. An educational program on the nutritional value of dairy products should be initiated.
4. Milk should be included in the school lunch program of Greece.

Livestock and Dairy Production

1. Improved management and feeding practices should be demonstrated to Greek farmers. They would then see how use of modern technology in livestock enterprise of adequate size could turn it into a profitable business. These demonstrations should be made in the following enterprises: Dairying; hog raising; mutton-wool sheep enterprises; calf feeding; and cow-calf raising.
2. The number of feed mills for mixing and preparing grain should be increased. These mills should add protein supplements and feed additives to provide the farmers with the proper rations to get the best possible returns.
3. Feed mills should provide fieldmen who can work with farmers and advise them as to how best to use feeds. For example, an experienced fieldman from a poultry area in the United States who has a good knowledge of the problems of disease control and poultry nutrition might work closely with some Greek counterparts to demonstrate the kind of service that the cooperatives of Greece could render their members.

4. Greece should continue its research on basic livestock breeds or crosses that can best be produced there.
5. Research should continue on the results of various grain mixtures, particularly mixtures of wheat and barley. These mixtures should include protein supplements and feed additives.
6. Research should be made on the costs of and returns from feeding and caring for livestock in groups as compared to individual stall feeding and care. As the cost of labor increases, the costs of and returns from enterprises that make intensive use of labor must be examined closely and compared with those of establishments that use labor less intensively.
7. Research is needed to determine the best way to have field crop aftermath utilized by livestock, wheat and barley fields after harvest, for example.
8. Continued research is needed to determine the importance of alfalfa (or other sources of Vitamin A) in accounting for a higher birth and growth rate among all classes of livestock. Similarly, a study is needed to determine the value of succulent forage (silage and green chop) to the production of more milk and beef.
9. The best source of good dairy cattle for commercial dairy production in Greece probably is Holstein heifers from the United States. A study comparing costs of importing such cattle, by air and by boat on a regular charter basis should be made.
10. In the immediate future, Yugoslavia, the United States, and possibly Ireland, probably are the best source of the feeder calves for Greece. Studies should be made of the cost of importing on a regular basis bull calves by air and by boat.
11. A demonstration feedlot containing several pens should be established so that cattle would be available for regular marketing. This operation should be large enough to be commercially feasible, and should be

managed and operated in the same manner as an American commercial feedlot. Such a feedlot could import weight cattle as well as buy from local sources to increase their weights to about 400 kilograms. Feeding and management methods could be demonstrated at this feedlot; and it could be an additional source of meat for the country. As a start, the baby Holstein bull calves now at the American Farm School might be used to stock such a demonstration feedlot.

12. The Extension Service needs to give farmers some guides as to the size of operation using modern methods of feeding and management needed to net a satisfactory profit. Producers need to have higher objectives as to the volume of business handled and management methods in their livestock enterprises.
13. A livestock development corporation should be established to foster, demonstrate, and carry out activities to accelerate the development of a modern, up-to-date livestock industry in Greece.

Land Consolidation

1. Every means should be utilized to stimulate further consolidation of farms. This should be emphasized as a step toward reducing unit costs and increasing farm output and farm income.
2. Arrangements should be made for more displays and demonstrations of farm machinery and tools.

Research

1. A research planning committee should be formed to evaluate agricultural problems needing examination. The research projects undertaken by various agencies would stem from this inventory of problems. This planning committee should identify not only present problems but anticipated ones as well--those expected to develop in the next 3 to 5 years.

2. Livestock and crop research should be oriented toward providing the answers to specific problems which now exist and which are likely to exist in the next 3 to 5 years.
3. All research and statistical information should be kept in a central depository or library. This would enable a research worker to quickly avail himself of what is available, and would prevent duplication of effort.

The following tabulation shows an estimation of the amount of land needed by producers of specified crops in the plains area to net a return of Dr. 40,000 in 1966.

Crop	:	Stremmas Needed
Alfalfa	:	
Irrigated	:	40
Nonirrigated	:	70
Corn	:	
Irrigated	:	60
Nonirrigated	:	100
Wheat	:	100
Barley	:	100
Oats	:	170

The following tabulation shows an estimation of the number of specified livestock needed by producers in the plains area to net a return of Dr. 40,000 in 1966.

Livestock	:	Number Needed
Cows (Holstein)	:	<u>1</u> /5
Pigs	:	<u>1</u> /115
Light Cattle (Greek)	:	40
Calves (Yugoslavian)	:	65
Ewes (milk, meat, wool)	:	70
Ewes (meat and wool)	:	100

1/ Management levels equal to those in the United States.

POSSIBLE LIVESTOCK DEVELOPMENT CORPORATION
IN GREECE

I. Objectives

- a. To coordinate a long-range program to modernize livestock and dairy production and marketing in Greece.
- b. To initiate commercial operations which can at an early date be turned over to private or cooperative enterprises.
- c. To reduce foreign exchange expenditures for meat and dairy products.
- d. To determine the need for importing technical advisers, and to arrange for obtaining their services.

II. Form of Organization

- a. Board of directors
- b. Management
- c. Operations

III. Source of Financing

- a. Government capital
- b. Tariffs - (on imported meats, poultry, and dairy products)
- c. Profits
- d. External loans (Export-Import Bank)
- e. Joint ventures with private industry--domestic and external

IV. Authorized Operations

- a. Importation of animals
- b. Breeding operations
- c. Feed mill and field service
- d. Operation of feedlots
- e. Operation of dairy centers
- f. Operation of dairy plants
- g. Operation of slaughterhouses
- h. Operation of meat processing plants
- i. Operation of cold storage facilities
- j. Operation of intermediate marketing
- k. Promotion
- l. Registration of purebred dairy cattle and service
- m. Operation of hog-raising enterprises
- n. Operation of a Market News Service
- o. Promote animal health
- p. Promote improved grazing management and practices
- q. Make available for sale livestock supplies, equipment, etc.

